

ABSTRACT

An electric field that changes across space is synthesized, by applying voltage levels independent of one another at several locations. The independence in voltage levels allows the electric field that is synthesized to be made periodic or aperiodic. Such a synthesized electric field may be changed at any time for use in, for example, a tunable laser. In one embodiment, the voltage levels are oversampled, although in other embodiments the voltage levels need not be oversampled, e.g. if the to-be-synthesized electric field is aperiodic. Also, in one embodiment, the electric field is used to change the refractive index of an electro-optic substance (such as lithium niobate) in an optical filter. Such an optical filter can be used as part of a wavelength agile laser or in an optical add drop multiplexer or in an optical switch. Such a filter can also be used for dynamic power balancing and/or for dynamic gain equalization.

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